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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/779,596
Filing Date: February 13, 2004
Appellant(s): ANDREACO ET AL.

JEFFREY N. CUTLER
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 02/01/2006 appealing from the Office action mailed 01/25/2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,319,204	WONG	06-1994
3,919,556	BERNINGER	11-1975
5,753,917	ENGDAHL	05-1998
6,087,663	MOISAN	07-2000
5,521,378	ROSCOE	05-1996
6,060,713	SKILLICORN	05-2000

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-5, 8-11, 14, 16-20, 22, 38, 46-48, 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong (U. S. Patent 5319204) and Berninger (U. S. Patent 3919556) and further in view of Engdahl (U. S. Patent 5753917).

Wong discloses an apparatus and method for position and energy determination of scintillation events caused by gamma rays when used in a variety of PET scanning systems, the apparatus comprising:

- a plurality of polished scintillation crystals 12 arranged in an array 16, where each array 16 may include a matrix of 8 x 8 crystals. The array is configured to occupy one quadrant of the adjacent array of
- photomultipliers 14 (14a-14d). The crystals 12 may be of any type (example BGO) and may be cut from a large block of scintillation material or can be formed from separate crystals.

When incident gamma rays interact with the scintillation elements a quantifiable number of scintillation photons are produced, the relative energies of which are recorded by the array of photomultipliers, the corresponding signals processed and analyzed, and the X and Y position coordinates of the scintillation event determined (i.e.

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the crystal in which the event occurred is determined). In this case (i.e., in the reference) the number of photomultiplier arrays (i.e. $(p \times q)$) is less than the number of scintillation crystal arrays $(m \times n)$, however the conventional prior art techniques use one detector for every scintillation crystal and thus $(p \times q)$ equals $(m \times n)$.

Wong et al. fails to disclose a continuous light guide positioned between the scintillation elements and the photomultiplier, however one of ordinary skill in the art would have been motivated to use a continuous light guide since as Berninger shows having a continuous light guide 15 optically bonded with a glass plate 11a to the output face of the scintillator 11 and the photomultiplier tube array 12 will provide an optically transparent medium to satisfy the linearity and the position resolution of the gamma camera and will also provide a refractive index match between the scintillator and the detector, a feature necessary to decrease spurious light scattering.

Wong fails to disclose that the scintillator crystal is composed of two different layers having different decay times where a pulse shape discrimination technique is used to determine the layer in which the gamma event occurred.

Engdahl discloses a scintillating camera which, performs high and low energy imaging in conventional PET applications where the camera includes:

- a scintillation crystal 12 assembly having a first layer 14 of Thallium doped Sodium Iodide NaI(Tl) with a first decay constant and a second layer 16 of CsI(Na) with a slower decay constant
- a photomultiplier tube array 22 for detecting and localizing (x, y, z positions and energy) the scintillation events within the layers of the crystal

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- a glass light guide 24 and
- detection circuitry 26 for detecting, discriminating (energy and pulse height), localizing and counting the scintillation events in the crystal 12. Incoming background rays are discriminated against on the basis of the signal amplitude.

One of ordinary skill in the art at the time the invention was made would have been motivated to use the scintillation crystal with multiple layers of Engdahl in the gamma camera of Wong since as Engdahl shows having a stacked layer configuration doubles the sensitivity of detecting a single photon when single photon imaging is used and quadruples the sensitivity of coincidence detection.

4. Claims 6, 7, 12, 13, 17, 23-35, 37, 39-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong and Berninger and Engdahl and further in view of Skillicorn et al. (U. S. Patent 6060713) and Roscoe et al. (U. S. Patent 5521378).

Wong fails to disclose that the scintillator elements are being composed of the specific materials claimed, however, as Skillicorn et al. shows, the preferred scintillators in a nuclear imaging camera are the high-Z Cerium-doped Lutetium Oxyorthosilicate and Cerium-doped Yttrium Oxyorthosilicate scintillator elements and thus one of ordinary skill in the art at the time the invention was made would have been motivated to use either one, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of design choice. *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960).

Also, as Roscoe et al. shows scintillator materials such as Thallium-doped

Sodium Iodide and Cerium-doped Gadolinium Oxyorthosilicate are commonly used in the art of gamma ray detection and thus one of ordinary skill in the art at the time the invention was made would have been motivated to use either one, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of design choice. *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960).

5. Claims 15, 21, 36, 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong, Berninger and Engdahl as applied to claims 15, 21 and 49, and over Wong, Berninger, Engdahl, Skillicorn and Roscoe as applied to claim 36 and further in view of Moisan et al. (U. S. Patent 6087663).

Wong utilizes a non-active light guide in the imaging gamma camera and thus he fails to use an active light guide, however one of ordinary skill in the art at the time the invention was made would have been motivated to replace the non-active light guide with an active one since as Moisan et al. shows having active light guides capable of encoding transverse and longitudinal coordinates of light emissions reduces the need of having separate scintillation elements and light guides connected to the detector array.

(10) Response to Argument

From the lengthy and confusing argument that the Applicant provided, the Examiner considers the following to be the main argument presented: there is no teaching, motivation or suggestion to modify Wong's PET camera to include a light guide as disclosed by Beringer. The Applicant argues that one of ordinary skill in the art

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would not be motivated to include a light guide as disclosed by Beringer in between the scintillator crystals and the photodiodes of Wong because Wong does not disclose the same exact scintillator and photodiode arrangement as that disclosed by Beringer. The Applicant seems to suggest that bodily incorporation of the particular light guide disclosed in Anger and Beringer is necessary for a motivation or suggestion to include an ordinary light guide into the Wong camera. Contrary to this assumption, the Examiner did not bodily incorporate the particular light guide of Anger and Beringer into the Wong reference, but merely provided the Beringer reference to show that using light guides between the scintillator crystals and the photodiodes is a well known and widely used practice in the field of PET imaging, and that light guides are used to satisfy the linearity and position resolution of the camera, as well as to provide a refractive index match between the scintillator and the photodiodes, which is something that is necessary to reduce spurious light scattering. In this field all light guides between the scintillators and associated photodiodes regardless of their shape are used for this particular reason. It is also well known in this field that the scintillators and photodiodes can take different shapes and that in order for the light guides to do their job they have to take on a corresponding shape. As such, using the reference to show that light guides are well known and used in the art does not inherently mean that the particular light guide disclosed in the reference has to be bodily incorporated into the Wong system. Since Wong is also concerned about reducing the errors in the measurement that spurious light scattering can generate, there is plenty of motivation (as clearly disclosed in the rejection above) to include a light guide into the PET camera, for its well

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known characteristic to reduce these scatterings. The Applicant's suggestion that in order to have a motivation to add a well known element, such as a light guide, from one camera (Beringer camera) to another camera (Wong camera) requires that the very first camera (Anger camera) that is mentioned in one of the references (Beringer) be incorporated in entirety (bodily incorporation) into the main reference (Wong), is legally and scientifically incorrect. First of all, the Anger camera that is mentioned in the Beringer reference is the very first PET camera (prototype), which was modified over the years through numerous improvements by others. Such an improvement was the inclusion of a light guide between the scintillator crystals and the photodiodes, as disclosed by Beringer. To require that all modifications and improvements that are made over the years would have to comply with the specific arrangements that were disclosed in the Anger camera is clearly wrong, for no improvements would ever be patented.

(11) Related Proceeding(s) Appendix


No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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OTILIA GABOR



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PRIMARY EXAMINER

Conferees:

DAVE PORTA



DREW DUNN

